



## **WATER RESOURCES RESEARCH GRANT PROPOSAL**

**Project ID:** 2005NY64B

**Title:** Export of atmospheric nitrogen deposition from forests at the top of the Susquehanna watershed

**Project Type:** Research

**Focus Categories:** Nutrients, Non Point Pollution, Acid Deposition

**Keywords:** Atmospheric N, forests, soil water

**Start Date:** 03/01/2005

**End Date:** 02/28/2006

**Federal Funds:** \$24,981

**Non-Federal Matching Funds:** \$32,100

**Congressional District:** 22

**Principal Investigator:**  
Christine Goodale

### **Abstract**

The Susquehanna River provides about three quarters of the nitrogen N delivered annually to the Chesapeake Bay. Primary productivity in the Chesapeake Bay is nitrogen limited, and so the added N drives processes of eutrophication and subsequent hypoxia. The majority of the N inputs to the Susquehanna watershed are from agricultural sources, including fertilizer, N-fixing crops and import of animal feed, yet atmospheric deposition of fixed N provides a major contribution (27%) to the watershed total N loading. This proposed research will obtain information on the quantity and immediate source of N exported from forested catchments at the top of the Susquehanna Basin, a region where human activities have increased rates of N deposition to levels 10 times greater than those occurring during pre-industrial conditions. Forested plots adjacent to the Connecticut Hill N deposition long-term monitoring site will be instrumented with lysimeters to collect soil water in and below the rooting zone. Combined with a model of soil water flux, analyses of the N concentration of soil water samples will allow assessment of forest N retention of atmospheric N in this understudied region. Additional surveys of stream N concentrations from nearby forested catchments will allow assessment of landscape variation in N export. Finally, isotopic analyses of the  $\delta^{15}\text{N}$  and  $\delta^{18}\text{O}$  signal of exported

NO<sub>3</sub>- will allow determination of the direct (short-term) contributions of atmospheric N to forest N export.